

DAIRY R & D IN SA

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SUBJECT: RESEARCH AND DEVELOPMENT PRIORITIES OF THE DAIRY INDUSTRY 2026-2029

The R & D priorities are lumped into three major sustainability focus areas, namely the Environment, Animal Health and Welfare and Food Safety & Security. The major attention within the focus areas is illustrated by the projects described below and their progress:

Environment:

- *Title:* The quantitative impact of different on-farm management options using the DESTiny tool
Objective: Development of a comprehensive model to calculate on-farm GHG (emissions/sequestration), water use and other parameters in relation to profitability.
Progress: Calculations on pasture-based systems, especially those utilising regenerative and multi-species, show that more carbon is sequestered than emitted, and that there is a positive relationship between such outcomes and profitability. The work still needs to be done on TMR farms, where there is not that much chance of sequestration but with feed composition manipulation and feed additives such as 3-NOP and seaweed etc., enteric and manure methane emissions can be cut by up to 30% (known technology), and because most larger TMR operations have milk yields in excess of 35 liters FPCM/cow/day (Holsteins) and 23 liters (Jerseys), the emissions per kg FPCM would be equal or better than elsewhere. The major issue to address is manure handling to limit GHG emissions.
- *Title:* An on-farm integrative waste and nutritive flow management decision-support tool for dairy production in South Africa
Objective: As N, P and K are spread through slurry water on pasture, two issues need to be addressed – one, the positive potential is that less fertilizer can be used for pasture growth if the correct ratios can be manipulated to, secondly, the negative potential is that excess N, P and K can pollute wetlands and streams/rivers. Thus, the objective is to measure the inputs and flows through the system and found ways to optimise the benefit and limit/eliminate the negatives. This is a large scale project involving several farms which will commence in 2026.
- *Title:* Field testing of phycoremediation on two dairy farms in South Africa.
Objective: This project links with the integrative waste and nutritive flow management project, in the sense that the value/efficacy of micro-algae in utilising/diluting N, P and K products in the slurry dam is investigated.
Progress: Early results are promising, but slurry dam construction alteration will probably be required, which means adding to cost.
- *Title:* Investigation of *Streptococcus uberis* in slurry of South African pasture based dairy herds.
Objective: There is concern that the use of slurry water on pasture may add mastitis causing and other pathogens to soil microbes. This will be tested; the project commencing in 2026.

Animal Health and Welfare:

- **Title:** Exploring the facial eczema problem in dairy cattle in the Eastern Cape of South Africa, with a focus on the fungus *Pseudopithomyces chartarum*
Objective: Sporidesmin toxicity (facial eczema) is an enormous problem in the south-eastern coastal pasture-based dairy systems. It is caused by the fungus *Pseudopithomyces chartarum* which primarily infects rye grass. There are several strains and the need was to characterize them to see which one(s) are responsible for the liver toxin (sporidesmin).
Progress: We have now established that it is only one strain, which is highly similar to the one in New Zealand, Australia and elsewhere, and which is now called *Pseudopithomyces toxicarius* to distinguish it from the other strains. We can now proceed to find a biological control method(s) for it.
- **Title:** Investigation of photosensitivity- related conditions in pasture-based dairy cattle
Objective: Sporidesmin toxicity results in photosensitivity painfully affecting the skin of the animal over time. The molecule phyloerythrin is a possible blood parameter which can be used for early detection. This needs to be tested, which will commence coming 2026.
- **Title:** Spore counting service from Thornhill to the Tsitsikamma area.
Objective: The fungus produces spores which attach to the ryegrass, and which the animal then consumes. The toxicity becomes a problem when the spore numbers exceed a particular level. With continuous monitoring farmers can receive early warning, and although this is strictly not research, the accumulation of data shows hotspots and support the sampling in the previous two projects.
Progress: This is a continuing action which started in 2022.
- **FMD Programme:**
Problem statement: The WOAHP regulations/guidelines are primarily associated with the FMD virus strains occurring in Europe and, since FMD is seldomly found in dairy cattle, because they are kept in intensive systems, the regulations/guidelines are rather inappropriate. However, these are strictly adhered to by the DoA as the WOAHP is the official body. In SA, FMD is caused by strains SAT 1, 2 and 3, and we need to address them; in this case in the context of dairying. What are the questions: (1) Can we pick up the virus in a bulk milk tank, and what is the time frame? (2) normal pasteurisation does not kill the virus; therefore, double pasteurisation is required, but one cannot make fresh cheese with such milk. (3) A possible solution for fresh milk would be if the DoA would consider a temperature of 85°C with a holding time sufficient to kill the virus, or the use of the lactoperoxidase enzyme, or lowering of the pH (fermentation of dairy products) of the milk to 4.6, thereby inactivating the virus. (4) For fresh milk an option could be to treat the milk to UHT standards but to pack it in non-aseptic or normal pasteurised milk packaging.
Objective: We need to research these options in association with the DoA and OVI to come up with defensible solutions which can be provided to the WOAHP, in order for regulations to be altered for SA. The work will start in 2026.

- *Title:* Brucellosis antibody ELISA test kit studies to motivate an acceptable test method in South Africa for DoA.

Objective: Uninterrupted surveillance testing is under threat due to the irregular availability of MRT (milk ring test) antigen produced locally. Furthermore, the import of MRT antigen is limited because the antigen is not commercially available for export from other countries, except for research reasons. Locally produced Brucellosis serum, that is used as a positive control in the MRT, is also regularly unavailable. Furthermore, the turnaround time for brucellosis test results from the DoA accepted indirect test methods in Provincial veterinary laboratories is not conducive to effective bovine brucellosis control in South Africa.

The objective, therefore, is to investigate alternative indirect test methods for brucellosis and to compare the results with the applicable accepted DoA test result to establish if there is any correlation. If the correlation is satisfactory, the outcome of the results will be presented to the DoA for approval as alternative acceptable indirect test methods for brucellosis testing. The test methods to be investigated are:

- Brucellosis antibody ELISA test kit for milk as an alternative to the MRT.
- Brucellosis antibody ELISA test kit for serum as an alternative to the CFT (Complement fixation test).

The project will commence in 2026.

This project overlaps with the sustainability focus area: **Food safety and Security.**

Food safety and security:

- *Title:* Establishment of a rapid test method for the detection of psychrotolerant bacteria and proteolytic enzymes in milk

Objective: The quality of milk country wide has been affected by a poor quality condition which is associated with coagulation of milk protein. In unprocessed milk the destabilisation of the milk protein results in coagulation with the alizarol alcohol platform test, and is referred to as flocculation. In Ultra-High-Temperature (UHT) milk the type of coagulation is referred to as gelation which affects shelf life and occurs when the milk protein becomes destabilized during storage as a result of residual intrinsic milk enzymes and bacterial enzymes. Since contamination with psychrotrophic bacteria such as *Pseudomonas* arguably is the major cause of the flocculation/gelation problem, a rapid test is being developed and validated in support of the alizarol test.

Progress: The project has commenced in 2024 and will continue in 2026.